

System-Level Autonomy Trust Enabler (SLATE), Phase II

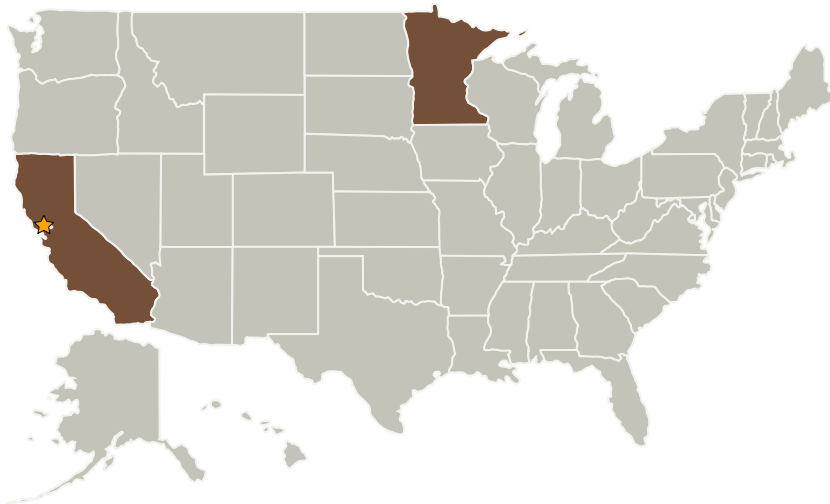
Completed Technology Project (2008 - 2010)



Project Introduction

This SBIR addresses the problem that current V&V technology provides component guarantees, but does not do well on system properties. Human acceptance of autonomy hinges on trusting system-level behavior. The goal is to develop technology to verify system properties for high-level autonomous control of complex systems operating in rich and unpredictable environments. The System-Level Autonomy Trust Enabler (SLATE) applies constraint-based models and reasoning to support incremental modifications necessary for system-level V&V of fixed and reconfigurable systems, given component-level guarantees. The significance of this innovation is to enable trusted high-level autonomous control systems across a wide range of critical applications, including manned and unmanned spacecraft, rovers, and habitats. If successful, this will simplify the process of control system design, maintenance, and reconfiguration in response to changes in the environment, the system being controlled, or the mission profile. Phase I addressed SLATE feasibility for requirements representation and reasoning. A TRL-4 proof-of-concept prototype on a multi-level robotic control system, implementing a surface robotics exploration mission, demonstrated that SLATE is feasible in practice. Phase II will develop an application-specific version and provide a user interface, improve performance and reasoning, and demonstrate operation on a NASA application.

Primary U.S. Work Locations and Key Partners



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Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Organizational Responsibility	1
Project Management	2
Technology Areas	2

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
Adventium Enterprises, LLC	Supporting Organization	Industry	Minneapolis, Minnesota

Primary U.S. Work Locations

California	Minnesota
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX14 Thermal Management Systems
 - └ TX14.2 Thermal Control Components and Systems
 - └ TX14.2.3 Heat Rejection and Storage